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## Rule DAS604: Excessive secondary extents were allocated

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**Finding:** CPExpert determined that an excessive number of secondary extents were allocated for the keyed sequenced data set (KSDS) or variable relative record data set (VRRDS) VSAM data sets listed.

**Impact:** This finding is used to assess problems or potential problems with VSAM primary and secondary allocation values for the data sets listed. The impact can be significant, particularly with on-line applications.

**Discussion:** When a VSAM data set is allocated, space allocation amounts normally are specified for both a primary allocation and a secondary allocation. When the primary amount on the first volume is used up, a secondary amount is allocated on that volume by the end-of-volume (EOV) routine, using the amount specified for the secondary allocation.

This space allocation process can be repeated until the volume is out of space or until the extent limit is reached. Depending on the type of data set allocation request, a new volume may be used if the current volume is out of space.

A large number of I/O operations is involved when the secondary allocation takes place. Consequently, a small amount of space should not be specified for the primary or secondary allocation value, especially for a KSDS data set or for a VRRDS data set<sup>1</sup>.

CPExpert examines the SMF Type 64 information contained in MXG TYPE64 data set to identify VSAM KSDS or VRRDS data sets that have excessive secondary allocations.

CPExpert compares NREXTNTS variable (the number of secondary extents in the VSAM data set this OPEN) with the **EXTENTS** guidance variable in USOURCE(DASGUIDE). CPExpert produces Rule DAS604 when the NREXTENT (the total number of extents) is greater than one, and the number of secondary extents allocated for this OPEN exceeds the value specified by the EXTENTS guidance variable.

The default value for the EXTENTS guidance variable is 0, indicating that CPExpert should produce Rule DAS604 when any secondary extent was allocated for the VSAM data sets listed.

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<sup>1</sup> If the VSAM data set is used **primarily by on-line applications**, you might establish a relatively small primary allocation (which would result in a small Control Area), so the impact of Control Area splits would be spread across the transactions encountering the Control Area splits. See Rule DAS600 for further discussion about this issue.

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The following example illustrates the output from Rule DAS604:

**Suggestion:** If CPExpert produces Rule DAS604, you should consider the following alternatives:

RULE DAS604: EXCESSIVE SECONDARY EXTENTS WERE ALLOCATED

VOLSER: RLS014. More than 0 secondary extents were allocated for the VSAM data sets listed below. There are a large number of I/O operations involved when the secondary allocation takes place. Depending on your I/O configuration and constraints, a large number of secondary allocations could cause significant performance degradation of applications. A large number of secondary extents normally means that the secondary allocation value is too small. This problem can be particularly serious for KSDS or VRRDS data sets.

SMF TIME STAMP	JOB NAME	VSAM DATA SET	..	TOTAL EXTENTS	EXTENTS THIS OPEN	FILE TYPE
10:00,29AUG2000	CICS2AGC	RLSADSW.VF03D.DATAENDB.DATA.....	..	10	6	KSDS DATA
10:30,29AUG2000	CICS2AGC	RLSADSW.VF03D.DATAENDB.DATA.....	..	10	6	KSDS DATA

- If a relatively large number of secondary allocations is made, you should consider increasing the primary allocation amount for the data set.
- Additionally, you should consider increasing the secondary allocation amount for the data set.
- If the above actions are not appropriate, you can change the EXTENTS guidance variable in USOURCE(DASGUIDE). Section 3 describes how to change the EXTENTS guidance variable if you feel that Rule DAS604 is produced too often, or if you do not wish to take action when secondary extents are allocated.
- Alternatively, you can exclude the reported VSAM data sets from analysis. Section 3 describes how to exclude VSAM data sets from analysis. However, you should be aware that no analysis of potential VSAM problems will be performed on data sets that are excluded from analysis.

**Reference:** *DFSMS: Using Data Sets* (SC26-7339 for OS/390; SC26-7410 for z/OS)  
Section 2.2.2.4: Allocating Space for VSAM Data Sets

*VSAM Demystified Redbook* (SG24-6105)  
Section 2.6: Parameters affecting performance